



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,391	07/01/2005	Hideyasu Matsumura	P28122	6325
7055	7590	01/25/2008	EXAMINER	
GREENBLUM & BERNSTEIN, P.L.C.			WINKLER, MELISSA A	
1950 ROLAND CLARKE PLACE			ART UNIT	PAPER NUMBER
RESTON, VA 20191			1796	
NOTIFICATION DATE	DELIVERY MODE			
01/25/2008	ELECTRONIC			

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
pto@gbpatent.com

Office Action Summary	Application No.	Applicant(s)	
	10/541,391	MATSUMURA ET AL.	
Examiner	Art Unit		
Melissa Winkler	1796		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 13 November 2007.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-9 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) Claim(s) _____ is/are allowed.
6) Claim(s) 1-9 is/are rejected.
7) Claim(s) _____ is/are objected to.
8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____
4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
5) Notice of Informal Patent Application
6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1-284536 to Takamasa et al. (Patent Family 2668384) in view of US 6,608,150 to Wicher et al.

Regarding Claims 1, 2, and 5. Takamasa et al. teach a method for producing expandable particles/beads of a vinyl aromatic-modified (i.e. styrene-modified) polyethylene-based resin (English-language Abstract, Lines 1-3).

In view of the applicants' admitted prior art in the instant specification, Takamasa et al. indicate that the polyethylene used is non-crosslinked linear low-density polyethylene. Furthermore, the composition of the polyethylene-based resin is 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin beads, 5 to 300 parts by weight of a vinyl aromatic monomer (e.g. styrene-based

monomer), and 1 to 3 parts by weight of a polymerization initiator relative to 100 parts by weight of the vinyl aromatic monomer. These ingredients are dispersed in an aqueous medium to obtain a dispersion (Instant Specification: Page 2, Lines 21 – 25 and Page 3, Lines 1 – 5). In the English-language abstract, Takamasa et al. state that a suspending agent such may also be dispersed in the aqueous medium (Lines 5 – 8), thereby rendering this aqueous medium a suspension.

The dispersion formed is heated at a temperature such that the vinyl aromatic (e.g. styrene) monomer is infiltrated/impregnated into the polyethylene resin particles/beads but polymerization of the monomer does not substantially occur (English-language Abstract, Lines 9 – 11).

In view of the applicants' admitted prior art in the instant specification, Takamasa et al. use linear low-density polyethylene-based resin beads with a melting point of 122°C (Instant Specification: Page 3, Lines 13 – 15). The polymerization of the vinyl aromatic (e.g. styrene) monomer is performed at a temperature of 115°C. If T °C is the melting point of the low-density polyethylene-based resin beads, this polymerization temperature falls between the range of higher than (T-8) °C and lower than (T+I) °C.

Takamasa et al. do not disclose a second polymerization in their method. However, Wicher et al. teach a step-wise process for polymerizing styrene monomer

using two different temperature stages. A polymerizing initiator such as organic peroxide is used in the final polymerization step preferably in an amount from 0.002 to 0.006 equivalents of peroxide initiator per liter of styrene (Column 6, Lines 54 – 59).

During the second polymerization, the suspension is heated at a temperature of between 110 and 115°C (see Examples). If T°C is the melting point of the low-density polyethylene-based resin beads, this polymerization temperature falls between the range of higher than (T-15)°C and lower than (T+5)°C and also between the range of higher than (T-8)°C and lower than (T+1)°C. As Takamasa et al. only disclose one polymerization, the total amount of vinyl aromatic (e.g. styrene) monomer used is 5 to 300 parts by weight relative to 100 parts by weight of the low-density polyethylene-based resin beads; however, a second polymerization step taught by Wicher et al. would require the addition of more styrene (see Examples) and one may consequently arrive at the weight range of styrene taught by the applicants. Takamasa et al. and Wicher et al. are analogous art because they encompass the same field of endeavor, namely the suspension polymerization process of styrene monomer. At the time of invention, it would have been obvious to a person of ordinary skill in the art to include an additional polymerization step in the process described by Takamasa et al. The motivation would have been that an additional polymerization step would be to

provide for a more complete polymerization of styrene, thereby reducing monomer content to acceptable levels for commercial processing.

Takamasa et al. disclose that the particles are impregnated with a volatile blowing agent during or after the polymerization (English-language Abstract, Lines 12 – 13).

In view of the applicants' admitted prior art in the instant specification, the resin components of the expandable beads contain a gel component comprising the graft polymer of polystyrene on the polyethylene chain (Page 3, Lines 13 – 25), though the specific what percentage weight of the gel component is comprised by the graft polymer is not disclosed by Takamasa et al. Consequently, the Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredient(s), and process limitation(s). Therefore, the claimed effects and physical properties, i.e. a gel component comprising 2 - 40 wt% of graft polymer, would implicitly be achieved by a composition with all the claimed ingredients. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1-284536 to Takamasa et al. (Patent Family 2668384) and US 6,608,150 to Wicher et al., as applied to Claim 1 above, and further in view of US 4,368,218 to Senda et al.

Regarding Claim 3. Takamasa et al., in view of Wicher et al., teach a method of producing expandable beads as described in Claim 1 but do not specify a shape for these beads. However, Senda et al. also teach a method of making expandable thermoplastic polymer beads in which a core of vinyl monomer (e.g. styrene) is surround by a layer of polyolefin (e.g. polyethylene). The expandable thermoplastic polymer beads generally have a spherical or ellipsoidal form/shape and range from 400 to 8000 microns (0.4 to 8.0 mm) in size (Column 4, Lines 30 – 34). Takamasa et al. and Senda et al. are analogous art because they are from the same field of endeavor, namely expandable polyethylene beads. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to form spherically shaped resin beads from the product of the method disclosed by Takamasa et al. The motivation would have been that electing a spherical shape for the resin bead would improve upon its expansion ratio, heat resistance, and mechanical properties.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1-284536 to Takamasa (Patent Family 2668384) et al. in view of US 6,608,150 to Wicher et al. as applied to Claims 1 and 5 above, and further in view of US 3,963,816 to Smith et al.

Regarding Claims 8 and 9. Takamasa et al., in view of Wicher et al., teach the expandable beads of styrene-modified linear low-density polyethylene-based resin as indicated in the discussion of Claim 5. In view of the applicants' admitted prior art in the instant specification, an expanded molded article is obtained from the expandable beads (Page 2, Lines 21 – 24). The applicants do not expressly indicate the method by which this expanded molded article is obtained. However, Smith et al. do teach an expanded molded article derived from pre-expanded beads. These beads are made by pre-expanding expandable beads of polyethylene and/or styrene (Column 3, Lines 1 – 18 and Column 4, Lines 3 – 12). Takamasa et al. and Smith et al. are combinable because they are from the same field of endeavor, namely expandable resin beads containing polyethylene and styrene. At the time of invention, it would have been obvious to person of ordinary skill in the art to pre-expand the resin beads, as taught by Smith et al., to obtain the expanded molded article taught by Takamasa et al. The motivation would have been that pre-expanding the beads allows one to control the density of the final product, which, in this case, is an expanded molded article.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1-284536 to Takamasa et al. (Patent Family 2668384).

Regarding Claim 4. Takamasa et al. disclose expandable beads of a styrene-modified linear low-density polyethylene-based resin, which contain a volatile blowing agent (English-language Abstract, Lines 1- 3 and 12 – 13).

The beads also contain a base resin that is 5 to 300 parts by weight of a vinyl aromatic monomer (e.g. styrene-based monomer) relative to 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin. The amount of styrene-based monomer is consequently not expressly taught Takamasa et al. However, the experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in the absence of unexpected results. *In re Aller*, 105 USPQ 233. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize the initial amount of styrene monomer to improve the elasticity of the beads. A *prima facie* case of obviousness may be rebutted, however, where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. *In re Boesch and Slaney*, 205 USPQ 215.

In view of the applicants' admitted prior art in the instant specification, the resin components of the expandable beads contain a gel component comprising the graft polymer of polystyrene on the polyethylene chain (Page 3, Lines 13 – 25), though the

specific percentage weight of the gel component that comprises the graft polymer is not disclosed by Takamasa et al. Consequently, the Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredient(s), and process limitation(s). Therefore, the claimed effects and physical properties, i.e. a gel component comprising 2-40 wt% of graft polymer, would implicitly be achieved by a composition with all the claimed ingredients. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1-284536 to Takamasa et al. (Patent Family 2668384) in view of US 3,963,816 to Smith et al.

Regarding Claims 6 and 7. Takamasa et al. teach the expandable beads of a styrene-modified linear low-density polyethylene-based as described above in Claim 4. In view of the applicants' admitted prior art in the instant specification, an expanded

molded article is obtained from the expandable beads (Page 2, Lines 21 – 24). The applicants do not expressly indicate the method of pre-expanding the expandable beads to make an expanded molded article. However, Smith et al. do teach an expanded molded article derived from pre-expanded beads. These beads are made by pre-expanding expandable beads of polyethylene and/or styrene (Column 3, Lines 1 – 18 and Column 4, Lines 3 – 12). Takamasa et al. and Smith et al. are combinable because they are from the same field of endeavor, namely expandable resin beads containing polyethylene and styrene. At the time of invention, it would have been obvious to a person of ordinary skill in the art to pre-expand the resin beads, as taught by Smith et al., to obtain the expanded molded article taught by Takamasa et al. The motivation would have been that pre-expanding the beads allows one to control the density of the final product, which, in this case, is an expanded molded article.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims

are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 - 9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims of copending Application No. 10/540,866. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are obvious variations upon each other. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding Claims 1 and 2. Current Claims 1 and 2 correspond to Claim 1 of Application No. 10/540,866.

Regarding Claim 3. Current Claim 2 corresponds to Claim 4 of Application No. 10/540,866.

Regarding Claim 4. Current Claim 4 corresponds to Claim 5 of Application No. 10/540,866.

Regarding Claim 5. Current Claim 5 corresponds to Claim 6 of Application No. 10/540,866.

Regarding Claim 6. Current Claim 6 corresponds to Claim 9 of Application No. 10/540,866.

Regarding Claim 7. Current Claim 7 corresponds to Claim 10 of Application No. 10/540,866.

Regarding Claim 8. Current Claim 8 corresponds to Claim 11 of Application No. 10/540,866.

Regarding Claim 9. Current Claim 9 corresponds to Claim 14 of Application No. 10/540,866.

Response to Arguments

The applicants' arguments filed on November 13, 2007 have been fully considered but they are not persuasive because:

A) In response to the applicants' assertion that Takamasa et al. do not teach a two step polymerization, this limitation is taught by Wicher et al. as discussed in the rejection of Claims 1, 2, and 5.

B) In response to the applicants' assertion that carrying out the polymerization of Takamasa et al. in two steps produces the unexpected effect of reducing the amount of styrene homopolymer formed, the Office recognizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredient(s) and process limitation(s). Wicher et al. teach the second polymerization step claimed and indicate that this second step is intended to minimize the residual amount of styrene monomer (Column 1, Lines 43 –

46), monomer that presumably would otherwise be available to form styrene homopolymer. Therefore, the claimed effects and physical properties, i.e. the reduction of the amount of styrene homopolymer formed, would implicitly be achieved by a composition with all the claimed ingredients. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients and process steps.

C) In response to the applicants' assertion that the Takamasa et al. and Wicher et al. references are non-analogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Takamasa et al. and Wicher et al. are both in the field of the applicants' endeavor, as both are concerned with the suspension polymerization of styrene monomers.

D) In response to the applicants' argument that the combination of the Takamasa et al. and Wicher et al. would not result in the claimed subject matter because Wicher et

al. teach the styrene-based monomer is not added in two portions, please see the discussion of the rejection of Claims 1, 2, and 5 above.

E) In response the applicants' assertion that Wicher et al. do not teach two defined stages of polymerization and the percent conversion of styrene at which the first stage of polymerization is completed, while the polymerization initiators are present from the beginning of the polymerization, they are activated at different temperatures. In Example 4 of the Wicher et al. disclosure, dibenzoyl peroxide (BPO), t-butyl peroxy-2-methylpropanoate (TBPMP), and 1,1,3,3-tetramethylbutyl peroxyacetate (TOPA) are added to the styrene monomer mixture. The mixture is then heated at 90°C for six hours (Column 9, Lines 27 – 36). Importantly, TOPA has a one hour half-life temperature is from 101° to 111°C, a one hour half-life temperature that is 7 to 17°C higher than that of BPO (Column 5, Lines 9 – 22). BPO is also indicated to have a percent conversion of styrene of 82.8% in six hours (Table I in Column 8). After the mixture in Example 4 is heated at 90°C for six hours, the mixture is then heated for two hours at 110°C to 112°C (Column 9, Lines 27 – 36). Again, TOPA has a one hour half-life temperature of from 101° to 111°C and TPMP has a one hour half-life that is about 5 to 10°C below this (Column 5, Lines 9 – 56).

F) In response the applicants' assertion that the Office does not explain why a person of ordinary skill in the art would employ the temperature conditions taught by Wicher et al. only for the second step, the Wicher et al. reference has then been included in the rejection of Claims 1, 2, and 5 because it teaches the *second* polymerization step claimed and corresponding temperature conditions. The primary reference (Takamasa et al.) could not be used to teach the claimed temperature conditions of the second polymerization step, as it teaches a single step polymerization.

G) In response to the applicants' assertion that it cannot be reasonably assumed that the percentage of gel component recited in Claim 1 would automatically be achieved by using the process taught by Takamasa et al. in view of Wicher et al., it is the Office's position that Takamasa et al. in view of Wicher et al. teach the reaction conditions claimed. As the applicants have indicated that the gel content is strongly dependent upon the specific reaction conditions employed (Applicants' Remarks, Page 10, Paragraph 2), the Office consequently argues a gel content in the claimed range can be reasonably assumed to be taught by Takamasa et al. in view of Wicher et al.

H) Regarding the applicants' assertion that the statement set forth on page 4 of the previous Office Action is based upon hindsight, the Office presumes this in regards to the statement that the second polymerization would require the addition of more

styrene. In response to this argument, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicants' disclosure, such a reconstruction is proper. *In re McLaughlin*, 443 F.2d 1392; 170 USPG 209 (CCPA 1971).

Furthermore, Takamasa et al. teach a one step polymerization in which 5 to 300 parts by weight of a vinyl aromatic monomer (i.e. styrene-based monomer) is used (Abstract, Lines 5 – 7). In Claim 1, the applicants set forth a second polymerization step in which additional styrene monomer is added. Wicher et al. teach this additional polymerization step, not taught by Takamasa et al., in which additional styrene monomer is added (see Examples). In the section of the previous Office Action cited by the applicants, the Office did not assert that the amount of styrene monomer added in the second polymerization step, taught by Wicher et al., when combined with Takamasa et al. would necessarily exceed the amount of styrene-based monomer beyond 300 parts by weight taught by Takamasa et al.

I) In regards to the applicants assertion that the claimed beads are not rendered obvious by Takamasa et al. because they contain more than 300 parts by weight of a polystyrene-based resin component, please see the rejection of Claim 4 above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Winkler whose telephone number is (571)270-3305. The examiner can normally be reached on Monday - Friday 7:30AM - 5PM E.S.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571)272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MW
January 15, 2008


MARK EASHOO, PH.D.
SUPERVISORY PATENT EXAMINER

1815 m 108